

**IN THE SPECIFICATION:**

*Please amend the priority claim as presented in the Supplemental Preliminary Amendment on December 17, 2001 as follows:*

This application is a continuation-in-part of United States patent application Serial No. 09/959,226, filed on October 18, 2001 and accorded a filing of January 23, 2002 under 35 U.S.C. §371 and entitled "Humidity Controller", which ~~claims the benefit of~~ is the United States National Phase application of PCT patent application No. PCT/NZ00/00156 which has an international filing date of August 9, 2000, ~~New Zealand patent application No. 337382 which has a filing date of August 23, 1999, and New Zealand patent application No. 507663 which has a filing date of October 19, 2000.~~ The International Application (PCT/NZ00/00156) and was published by the International Bureau in English on March 1, 2001 under International Publication Number WO 01/13981 A1.

*Please add the following paragraphs after line 29 on page 6:*

In a second aspect a method of delivering humidified gas at a desired level of humidity or at a desired temperature to a patient using an open loop controlled humidifier comprising the steps of:

- (a) determining a parameter relating to the flow rate of said gas through said humidifier;
- (b) determining based on at least said parameter the required electrical power to said humidifier to deliver said gas to said patient at a level of humidity or at a temperature substantially similar to said desired level of humidity or said desired temperature;

(c) supplying a level of power to said humidifier substantially similar to said determined power;

(d) continuously monitoring said parameter, and when a change in said parameter is greater than a first threshold, indicating a change in the flow rate of said gas, revert to step (a).

Preferably said method further comprising: when a change in said parameter is greater than a second threshold indicating said controller or processor reverts to instruction (b), said second threshold relating to a lesser change in the flow rate than said first threshold.

Preferably said method further comprising the steps:

conveying said humidified gas to a patient

heating the conveyed gas either directly or indirectly using a conduit heater;

sensing or making an assumption of the exterior temperature;

and said instruction (b) further comprises determining based on at least said indication of the exterior temperature the required power input to said conduit heater to deliver said gas to said patient at a level of humidity or at a temperature substantially similar to said desired level of humidity or said desired temperature;

and said instruction (c) further comprises supplying as said input power to said conduit heater a level of power substantially similar to said determined power input to said conduit heater.

Preferably said first threshold relates to the rate of change of said parameter with respect to time, wherein when said rate of change is greater than said first threshold said controller or processor reverts to said instruction (a).

Preferably said rate of change or said change in said parameter indicates a decrease in flow said controller or processor pauses for a first delay before said controller or processor

reverts to step (a) and if said rate of change or said change indicates an increase in flow said controller or processor pauses for a second delay before said controller or processor reverts to step (a), said second delay being longer than said first delay.

Preferably said method further comprising the step of monitoring the input power supplied to said conduit heater to provide an indication of the resistance or temperature of said conduit heater.

Preferably said indication of the temperature or resistance is used at least in step (d) as said parameter relating to the flow rate of said gas.

Preferably said input power to said conduit heater comprises a voltage signal and a current signal, and said indication of the temperature or resistance relates at least in part to said voltage signal and/or said current signal and said input power to said conduit heater.

Preferably said humidifier comprises a humidification chamber adapted to receive a volume of water and water heater to heat said water to produce water vapour within said chamber in use, said gas passing through said water vapour in said chamber thereby being humidified, said instruction (a) further comprising:

- i) energising said water heater to heat said water towards a first condition,
- ii) continuously monitoring said parameter or a variable indicative of a property of said water heater, until said variable or said parameter indicates that said water has substantially reached said first condition,
- iii) determining said parameter based on at least said variable and said indication of the external temperature.

Preferably the determination of said power to said humidifier in said instruction (b) is also based on said indication of the external temperature.

Preferably said method further comprising the step of supplying gas to said humidifier at a required pressure and resulting flow rate.

Preferably said method further comprising the step of determining the level of electrical power required to supply said gas at a required pressure and resulting flow rate, from which the flow rate of said humidified gas is determined.

Preferably said gas is supplied by a fan driven by a variable speed electric motor.

Preferably said parameter is based on the current drawn by said variable speed motor.

Preferably said parameter is determined directly from a gas flow rate sensor.

Preferably said method further comprising:

sensing the temperature of said water heater and providing an indication of the electrical power drawn by said water heater,

wherein said variable is indicative of the temperature of said water heater or said indication of the power drawn by said water heater.

Preferably said method further comprising:

sensing the temperature of said water heater and providing an indication of the electrical power drawn by said water heater,

wherein said variable is indicative of the temperature of said water heater or said indication of the power drawn by said water heater.

In a third aspect the invention consists a breathing assistance apparatus adapted to deliver humidified gas at a desired level of humidity or at a desired temperature to a patient using open loop control comprising:

humidifier having an electrical input power and capable of humidifying said gas up to a level of humidity prior to delivery to said patient, said level of humidity depending on said input power to said humidifier,

means for determining a parameter relating to the flow rate of said gas through said apparatus;

means for determining based on at least said parameter the required electrical power input to said humidifier to deliver said gas to said patient at a level of humidity or at a temperature substantially similar to said desired level of humidity or said desired temperature;

means for supplying as said input power to said humidifier a level of power substantially similar to said determined power input to said humidifier;

means for continuously monitoring said parameter , and when a change in said parameter is greater than a first threshold, indicating a change in the flow rate of said gas, the flow rate is determined again.